

**TEMPORARY COVERED SOURCE APPLICATION REVIEW**  
**Permit Number: 0586-01-CT**

Applicant: **Royal Contracting Company**  
Application No. 0586-01 New Application

Facility: **280 tph Pegson Premiertrak Jaw Crusher  
with 300 bhp (224 bkW) Caterpillar Diesel Engine (DE)**

Located At: Various Locations, State of Hawaii  
Initial Location: Off-road, extended out approximately 200m from the end of (the loop of) Makakilo Drive

UTM-Coordinates: Zone 4, 595,665 m E, 2,362,826 m N (NAD 83)

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Standard Industrial Classification Code: 1429 Crushed and Broken Stone

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**Equipment Description and Specifications**

<u>Equipment</u>	<u>Description</u>
1. Jaw Crusher	280 tph B.L. Pegson, model 26" x 44" Premiertrak, serial number 650 101 BB, manufactured in 2004.

This is a contained mobile tracked unit with hopper, two-way dirt chute, side conveyor, conveyor with hydraulic tail lift, magnetic separator, and dust suppression water sprays

2. Diesel Engine 300 hp Caterpillar, model C9, serial number CLJ 04307, fuel oil no. 2, less than 0.5% sulfur by weight, at maximum consumption 15 gallons per hour. The diesel engine (DE) is on the jaw crusher.

The raw material consists of basalt and concrete. Rebar and other metals are removed by a built-in magnet. The raw material is dumped into the feeder by a front end loader. Undersized material falls through the feeder bars onto conveyor belt no. 1 to stockpile no. 1 beside crusher. The material caught by the feeder goes through the jaw crusher and onto conveyor belt no. 2 and stockpile no. 2.

### **Applicable Requirements**

Hawaii Administrative Rules (HAR) Title 11

Chapter 11-59, Ambient Air Quality Standards

Chapter 11-60.1 Air Pollution Control

Subchapter 1, General Requirements

Subchapter 2, General Prohibitions

§11-60.1-31 Applicability

§11-60.1-32 Visible Emissions

§11-60.1-33 Fugitive Dust

§11-60.1-38 Sulfur Oxides from Fuel Combustion

Subchapter 5, Covered Sources

Subchapter 6, Fees for Covered Sources, Noncovered Sources, and  
Agricultural Burning

§11-60.1-111 Definitions

§11-60.1-112 General Fee Provisions for Covered Sources

§11-60.1-113 Application Fees for Covered Sources

§11-60.1-114 Annual Fees for Covered Sources

Subchapter 8 Standards of Performance for Stationary Sources

§11-60.1-161 New Source Performance Standards

Subchapter 9, Hazardous Air Pollutant Sources

Subchapter 10, Field Citations

40 Code of Federal Regulations (CFR) Part 60-Standards of Performance for  
New Stationary Sources

Subpart A-General Provisions

Subpart OOO-Standards of Performance for Nonmetallic Mineral  
Processing Plants

Standards of Performance for New Stationary Sources [also known as New Source Performance Standards (NSPS)] is applicable. A portable crushed stone plant, that commences construction, reconstruction, or modification after August 31, 1983, with a capacity of 150 tons per hour or greater, is subject to the requirements of Title 40 Code of Federal Regulations (CFR) Part 60 Subpart OOO Standards of Performance for

Nonmetallic Mineral Processing Plants. Fixed sand and stone plants with capacities of 25 tph or greater are subject to the same provisions. The maximum capacity of this jaw crusher is greater than 150 tph and was manufactured in 2004. All conditions as specified in Subpart OOO apply to this facility.

Synthetic Minor refers to sources which have the potential to emit greater than 100 ton per year of a regulated air pollutant, or 10 tons per hazardous air pollutant, or 25 tons per year for any combination of HAPs, but where limits are proposed to reduce emissions below these levels. A synthetic minor source is a potentially major source but is made a minor source through federally enforceable permit conditions, for example, limiting the facility's hours of operation, limiting the facility's fuel consumption, or the plant's material production throughput. Pollution control devices are considered as part of the facility. Based on the maximum potential of 8,760 hours per year, and the limited hours of operation, this stone crushing plant is a synthetic minor.

### **Non-Applicable Requirements**

Compliance Assurance Monitoring (CAM) Part 64 of the CFR for large emission or major sources that rely on air pollution control devices to achieve compliance. Applicability of the CAM Rule is determined on a pollutant specific basis for each affected emission unit. Each determination is based upon a series of evaluation criteria. In order for a source to be subject to CAM, each source must apply to all of the below:

1. Be located at a major stationary source per Title V of the Clean Air Act Amendments of 1990? No.
2. Be subject to federally enforceable applicable requirements. Yes.
3. Have pre-control device potential emissions that exceed applicable major source thresholds. Yes.
4. Be fitted with an "active" air pollution control device; No.
5. Not be subject to certain regulations that specifically exempt it from CAM. Yes.

Emission units are any part or activity of a stationary source that emits or has the potential to emit any air pollutant. This stone processing plant does not have any active pollution control devices except for their water spray system to minimize their fugitive emissions. Water sprinklers are not pollution control devices applicable to CAM. CAM is not applicable because this facility does not meet all of the above requirements.

Consolidated Emission Reporting Rule (CERR) as defined by 40 CFR Part 51, Subpart A-Emissions Inventory Reporting Requirements. CERR is established to simplify reporting, offer options for data collection and exchange, and unify reporting dates for various categories of criteria pollutant emission inventory, for example, point, area, onroad, and nonroad mobile, and biogenics.

This rule applies to state and local agencies. CERR is based on facility-wide emissions for each air pollutant that emits at or exceeds the CERR and DOH triggering levels are shown in the table below.

<b>Pollutant</b>	<b>1-280 tph Stone Crushing Plant (tpy)</b>	<b>300 bhp Diesel Engine (tpy)</b>	<b>CERR Trigger Levels Annual Inventory Type A/B Point Source (tpy)</b>	<b>In-house Total Facility Trigger Levels (tpy)</b>
NO <sub>x</sub>	-	11	2,500 / 100	25
SO <sub>x</sub>	-	0.7	2,500 / 100	25
CO	-	2.3	2,500 / 1000	250
PM <sub>10</sub>	2.9	0.8	250 / 100	25
PM <sub>2.5</sub>	0.7	0.2	250 / 100	25
VOC	-	0.9	250 / 100	25
NH <sub>3</sub> <sup>1</sup>	N/A	N/A	250 / 100	
Pb <sup>1</sup>	N/A	N/A	5	0.6

<sup>1</sup> NH<sub>3</sub> (ammonia) and Pb (lead) are not available.

<sup>2</sup> PM<sub>2.5</sub> value, 15% of PM, referenced from AP-42; Appendix B.2; Table B.2.2; Category 3; Process: Mechanically Generated; Material: Mechanically Generated; For PM<sub>2.5</sub> = (4.3) x (0.15) = 0.65.

This facility does not have any individual emission points that emits at the CERR or in-house triggering levels. However, because this is a covered source, annual emissions reporting is required.

National Emission Standards for Hazardous Air Pollutants for Source Categories (NESHAPS): Pursuant to section 112 of the Clean Air Act (CAA), 40 CFR Part 61, §61.01(a) lists the substances which have been designated as HAPs. Under this part, NESHAPS is not applicable because there are no listed standards for crushers. Very little HAPs (0.02 tons per year) are being emitted from the fuel oil no. 2 burning diesel engine.

Prevention of Significant Deterioration (PSD): 40 CFR Part 52, §52.21, PSD review applies to any state implementation plan 40 CFR, Part 52, Subpart M, to new major stationary sources and major modifications to these types of sources as listed and defined in HAR, Title 11, Chapter 11-60.1, Subchapter 7. This facility is not a major stationary source for any single air pollutant. Annual emissions with water sprays are calculated at less than 20 ton/year. Hence, PSD review is not required.

Best Available Control Technology (BACT) analysis applies to new and modified sources if the net increase in pollutant emissions exceed "significant levels" as defined in HAR §11-60.1-1 (considering any limitations, enforceable by the Department of Health, on the source to emit a pollutant). Also, for listed categories in CFR Parts 60, 61, and 63, BACT determination includes all fugitive emissions, except vehicle traffic emissions, which is included if the definition of "major", requires the consideration of fugitives in calculating potential emissions for major source determination.

BACT is an emissions limitation based on the maximum degree of reduction for each pollutant. On a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, if achievable through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of the pollutant, the applicant eliminates or supports step-by-step pollution control options, beginning at the top of a list of best available pollution control technology, taking into account:

- (1) Energy;
- (2) Environmental; and
- (3) Economic impacts and other costs, if achievable through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of the pollutant.

See Project Emissions below, for emission calculations. The calculated potential maximum emissions for the Pegson Premiertrak jaw crusher, does not exceed "significant level", or 40 tons for particulate matter at 10 micrometers diameter and less. Therefore, a Best Available Control Technology analysis is not required for this facility.

Title 40 Code of Federal Regulations Part 63-National Emission Standards for Hazardous Air Pollutants for Source Categories Maximum Achievable Control Technology (MACT) means the maximum degree of reduction in emissions of the hazardous air pollutants (HAPs), on a case-by-case basis, taking into consideration the cost of achieving such emission reduction and any non-air quality health and environmental impacts and energy requirements, that is deemed achievable.

This source is not subject to MACT because there are no listed standards for jaw crushers.

**Insignificant Activities/Exemptions**

1-fuel tank (500 gal) per HAR§11.60.1-82(f)(1)

**Alternative Operating Scenarios**

The applicant proposed an alternate temporary replacement for the 300 bhp diesel engine if any situation reasonably warrants removal of the diesel engine, for example, engine failure, or a need for engine overhaul. The replacement engine shall have equal or less emissions than the original engine. The replacement diesel engine shall comply with the same terms and conditions as the initial DE. The permittee shall submit the necessary information to the Department, with the Department's approval, prior to installing the replacement.

**Project Emissions**

The pollutant from the Pegson Premiertrak jaw crusher is fugitive dust (PM). Emissions from the diesel fuel fired point source diesel engine are various criteria and hazardous air pollutants.

The criteria pollutants are total suspended particulates (TSP), particulate matter less 10 micrometers (PM<sub>10</sub>, µm), sulfur oxide (SO<sub>x</sub>), carbon monoxide (CO), and total organic compounds (TOC).

The Clean Air Act (CAA) procedure is to set the emission calculations based on the maximum capacity of the crusher which in this case is 280 tph. AP-42, 5<sup>th</sup> edition, Table 11.19.2-2 Emission Factors for Crushed Stone Processing Operations, August 2004, was used to calculate the fugitive dust emissions from the Pegson Premiertrak jaw crusher. Because there were no primary and secondary crushing emission factors (EF), the tertiary crushing emission factor was used to predict crushing emissions. In this Premiertrak crusher, there appears to be just one crusher. The "fines crushing" and "fines screening" do not appear to be applicable to this permittee's operations.

AP-42 Table 3.3-1 Emission Factors For Uncontrolled Diesel Industrial Engines, and Table 3.3-2 Speciated Organic Compound Emission Factors For Uncontrolled Diesel Engines, October 1996, were used to estimate the emissions from the diesel engine. Emissions were calculated with a maximum fuel consumption rate of 15.0 gallons per hour (gph), high heat value of 137,000 MMBtu/pound (MMBtu/lb), and 7.1 pounds per gallon of fuel oil no 2, for the DE.

For fugitive emission calculations, 70% efficiency was used at nozzle locations and throughout the processing line.

<b>UNCONTROLLED ESTIMATED EMISSIONS<sup>1</sup></b> <b>OF CRITERIA AND HAZARDOUS AIR POLLUTANTS</b> <b>280 tph PEGSON PREMIERTRAK JAW CRUSHER</b> <b>w/ 300 hp DIESEL ENGINE</b>								
Pollutant and Description	300 hp Diesel Engine		Fugitive Dust Stone Processing		300 hp Diesel Engine		Fugitive Dust Stone Processing	
	2400 hr/yr		2400 hr/yr		8760 hr/yr		8760 hr/yr	
	lbs/hr	tons/yr	TSP ton/yr	PM <sub>10</sub> tons/yr	lbs/hr	tons/yr	TSP tons/yr	PM <sub>10</sub> tons/yr
TSP	0.637	0.765			0.637	2.791		
PM <sub>10</sub>	0.637	0.765			0.637	2.791		
CO	1.952	2.343			1.952	8.553		
NO <sub>x</sub>	9.063	10.88			9.063	39.703		
SO <sub>x</sub>	0.596	0.715			0.596	2.611		
TOC	0.740	0.888			0.740	3.241		
Benzene	0.002	0.002			0.002	0.008		
Toluene	0.001	0.001			0.001	0.004		
Xylenes	0.001	0.001			0.001	0.003		
Propylene	0.005	0.006			0.005	0.023		
1,3 Butadiene	0.0001	0.0001			0.0001	0.0004		
Formaldehyde	0.002	0.003			0.002	0.011		
Acetaldehyde	0.002	0.002			0.002	0.007		
Acrolein	0.0002	0.0002			0.0002	0.0008		
Naphthalene	0.0002	0.0002			0.0002	0.0008		
PAH <sup>2</sup>	0.0003	0.0004			0.0003	0.002		
Pri Crusher			1.81	0.81			6.62	2.94
Sec Crusher			-	-			-	-
Tert Crusher			-	-			-	-
Fines Crushing			-	-			-	-
Screening			8.40	2.92			30.66	10.67
Fines Screen			-	-			-	-

# DRAFT

Conveyor Transfer Pts			4.03 4 pts	1.48 4 pts			14.72	5.40
Wet Drilling			-	-			-	-
Truck Unload Fragmented			0.01	0.01			0.02	0.02
Truck Unload Conveyor			0.03	0.03			0.12	0.12
Unpaved Road <sup>3</sup>			25.82	13.16 <sup>3</sup>			94.24	48.03
Storage Piles <sup>3</sup>			9.53	4.51			34.78	16.46
$\Sigma$		HAPs 0.02	TSP 50✓	PM <sub>10</sub> 23✓		HAPs 0.06	TSP 181	PM <sub>10</sub> 84

<sup>1</sup> See individual calc sheets in file folder for calculations and specific data.

<sup>2</sup> PAH, polycyclic aromatic hydrocarbons

<sup>3</sup> Unpaved Roads and Storage Piles were taken from the application.



<b>CONTROLLED ESTIMATED EMISSIONS<sup>1</sup></b> <b>OF CRITERIA AIR POLLUTANTS</b> <b>280 tph PEGSON PREMIERTRAK JAW CRUSHER</b>				
Description	Fugitive Dust Stone Processing			
	2400 hr/yr		8760 hr/yr	
	TSP ton/yr	PM <sub>10</sub> tons/yr	TSP tons/yr	PM <sub>10</sub> tons/yr
Primary Crusher	0.54	0.24	1.99	0.88
Secondary Crusher	-	-	-	-
Tertiary Crusher	-	-	-	-
Fines Crushing	-	-	-	-
Screening	2.52	0.88	9.2	3.2
Fines Screening	-	-	-	-
Conveyor Transfer Points 4	1.21	0.44	4.42	1.62
Wet Drilling Unfragmented	-	-	-	-
Truck Unloading Fragmented	0.00	0.00	0.01	0.01
Truck Unloading Conveyor	0.01	0.1	0.04	0.04
Unpaved Roads <sup>2</sup>	7.75	3.95	28.29	14.42
Storage Piles <sup>2</sup>	2.86	1.35	10.44	4.93
Σ Totals	TSP 15	PM <sub>10</sub> 7	TSP 54	PM <sub>10</sub> 25

<sup>1</sup> See individual calc sheets in file folder for calculations and specific data.

<sup>2</sup> Unpaved Roads and Storage Piles were taken from the application.

### **Air Pollution Controls**

The Pegson Premiertrak crusher has 3 sets of dust suppression water spray nozzles connected to the central manifold. A water truck is on site and is used to minimize fugitive dust on access roads and other areas around the plant.

The 300 hp (225 kW) diesel engine (DE) will be fired exclusively on fuel oil no. 2 with less than or equal to 0.5% sulfur content by weight to minimize sulfur dioxide emissions.

### **Air Quality Assessment**

Ambient air means the general outdoor atmosphere to which the public has access. The numerical ambient air standards limit the time-average concentration of specified pollutants dispersed or suspended in the ambient air of the State, and these standards do not in any manner authorize the significant deterioration of existing air quality in any portion of the State.

An ambient air quality impact analysis is performed for new or modified sources. The ambient air quality standards seek to protect public health and welfare and to prevent the significant deterioration of air quality.

The Department of Health air modeling guidance generally exempts an applicant from performing an ambient air quality impact analysis for

- (1) existing sources with no proposed modifications,
- (2) insignificant activities,
- (3) fugitive emission sources (for example, storage tanks, storage piles, and pipe leaks), and
- (4) intermittent operating noncombustion sources.

This plant is a new source, therefore, the diesel engine's stack emissions of pollutant concentrations needs to be assessed to verify compliance with the ambient air quality standards.

AP-42 Table 3.3-1 Emission Factors For Uncontrolled Diesel Industrial Engines less than 600 hp, October 1996, were used to estimate the emissions from the diesel engine for sulfur oxide (SO<sub>x</sub>) and total organic compounds (TOC). The emission factors in units of pounds of pollutant per million Btu of fuel oil were converted to pounds per hour and then to grams per second for modeling.

The emissions for nitrogen oxide (NO<sub>x</sub>), carbon monoxide (CO), and particulate matter with less than 10 micrometers (PM<sub>10</sub>, µm) in units of pounds per hour were taken from the manufacturer Caterpillar's catalog submitted by the applicant, and converted into grams per second for modeling input.

CRITERIA POLLUTANT EMISSION RATE					
	NO <sub>x</sub>	CO	SO <sub>x</sub>	PM <sub>10</sub>	TOC
pound/hour	3.95	0.63	0.60	0.06	0.74
gram/second	0.50	0.08	0.075	0.008	0.093

The following table shows the results of the SCREEN3 modeling, consistent with 40 CFR Part 51, Appendix W, choosing simple terrain, with the dimensions of the jaw crusher as downwash wake structure. Screen3 default meteorology was used to predict ambient air impacts. See "Source Information" section in file folder for input and output text and results of Screen3, and maximum concentration 1,696 micrograms per cubic centimeters, at touchdown 13 m from stack.

The applicant proposed to limit to 2,400 hours per rolling twelve (12) month period.

DEG STACK DATA					
Stack Ht	Stack Dir	Stack Id	Exit V	Flow Rate Q	Stack Gas Exit Tmp
13' - 1" (4m)	up	4" (0.1016m)	352 ft/s (107.52 m/s)	1847 ft <sup>3</sup> /min (0.8716 m <sup>3</sup> /s)	792.8°F (695.8 °K)

COMPLIANCE WITH AMBIENT AIR QUALITY STANDARDS						
280 TPH Portable Stone Quarrying/Processing Plant and 300 hp Diesel Engine						
AIR POLLUTANT	AVG'G TIME	PREDICTED AIR QUALITY IMPACTS (µg/m <sup>3</sup> )			HAWAII AIR STANDARD (µg/m <sup>3</sup> )	PERCENT OF STD (%)
		DEG	BCKGRD <sup>1</sup>	TOTAL		
Carbon Monoxide CO	1-hour	136	2394	2,530	10,000 5,000	25
	8-hour	95	983	1,078		22
Nitrogen Dioxide NO <sub>2</sub>	Annual	46	9	55	70	79
Particulate Matter PM <sub>10</sub>	24-hour	5	53	58	150 50	39
	Annual	0.7	13	14		27
Sulfur Dioxide SO <sub>2</sub>	3-hour	115	17	132	1,300 365 80	10
	24-hour	51	7	58		16
	Annual	7	1	8		10

<sup>1</sup> Background from 2004 Annual Summary Hawaii Air Quality Data.

<sup>2</sup> Receptor of greatest impact occurred at 13 m distance.

**Other Issues**

None.

**Significant Permit Conditions**

1. Subject to Title 40 Code of Federal Regulations (CFR) Part 60-Standards of Performance for New Stationary Sources, Subpart OOO.
2. A non-resetting hour meter shall be installed on the 300 bhp diesel engine for the recording of the 2400 limiting hours of operation of the Portable Stone Quarrying and Processing Plant.
3. The Pegson Premiertrak jaw crusher shall be equipped with a water spray system to reduce emissions of fugitive dust. This water spray system shall be utilized as necessary while the plant is in operation.
4. For periods of diesel engine breakdown or overhaul, prior to the removal, the permittee shall submit to the Department of Health, written documentation on the removal and estimated return dates and on the make, size, model, and serial number for both the temporary replacement unit and the existing unit.

**Conclusion And Recommendation**

Based on the information submitted by the applicant, it is the determination of the Hawaii Department of Health that the existing project will be in compliance with 40 CFR Part 60, Subpart A, Subpart OOO, and the Hawaii Administrative Rules (HAR), Chapter 11-60.1, and will not cause or contribute to a violation of any State or National ambient air quality standards.

Conservatism was applied to the estimated emissions from this facility. The actual crushing throughput will be much lower (basalt) than the assumed maximum design capacity used in the AP-42 emission calculations (limestone). Except for the modeling of ambient air quality, the AP-42 emission factors, which were higher than the manufacturer's pound per hour emission factors, were used to calculate the maximum potential emissions for the diesel engine. Therefore, the Hawaii DOH intends to issue this CSP No. 0586-01-CT, subject to permit conditions, public comments, and EPA review.

Glenn Nagamine  
October 2005